

REMARKS

Claims 1-19 were pending in the application.

Claim 1 is amended to specify that the linking channel (3) is divided once into more than two part channels (7) by microstructure parts (6) immediately prior to opening into the mixing zone (5). Support for dividing the linking channel only once and immediately before opening into the mixing zone is found in all of the examples in the specification as originally filed, in which the linking channel is divided only immediately before the linking channel opens into the mixing zone. Support for the term "microstructure parts" is found, for example, in the last paragraph on page 2 of the specification as originally filed.

Claim 3 is amended to correct a typographical error.

Claims 15-17 are amended to recite "microstructure parts" to be consistent with the amendment to claim 1.

New claim 20 is added, and is analogous to claim 1, as amended, but additionally specifies that the length of the part channels is sufficient for flow control but which minimizes pressure for a given throughput. Support for new claim 20 is found, for example, in the specification as originally filed in the second to last paragraph on page 3.

New claim 21 is added and specifies that a length-to-width ratio of each of the part channels (7) is 8:1 to 12:1 and a width of each of the part channels (7) in claim 20 is from 5 μm to 250 μm . Support for new claim 21 is found, for example, in the specification as originally filed in the second to last paragraph on page 3 and the first full paragraph on page 4.

New claim 22 recites a process analogous to claim 1, as amended, but recites distinguishing limitations as process steps in terms of first and second immiscible fluids. New claim 23 specifies that the second fluid is delivered to the mixing zone in the same manner as the first fluid in new claim 22. Support for new claims 22 and 23 may be founding the claims as originally filed and in the examples and page 2, second full paragraph in the specification.

No new matter is added.

Claim Objections

Claim 3 is objected to over the inadvertent repetition of the word "wherein." In view of the correcting amendment to claim 3, Applicant respectfully requests that the objection be withdrawn.

Claims Rejections 35 U.S.C. 103

Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hemming** (ISBN 3-8023-0084-X, pp158-9) in view of **Ehrfeld** et al. (US 2003/0039169 A1). The Examiner's rejection has been carefully considered.

Claim 1 is amended to specify that the linking channel (3) is divided once into more than two part channels (7) by microstructure parts (6) immediately prior to opening into the mixing zone (5).

Applicant argues that claims 1-19 are patentable over Hemming in view of Ehrfeld because the cited references do not teach or suggest every limitation recited in claim 1, as amended. Specifically, neither reference teaches or suggests microstructure parts (6) that divide a linking channel into more than two part channels

immediately before opening into a single mixing zone and wherein the linking channel is divided only once (i.e. by the microstructure parts).

Ehrfeld is relied upon in the rejection for teaching the geometry of the micromixer recited in the method (process) of claim 1. Ehrfeld teaches a micromixer that requires a specific linking channel geometry that correlates with the function of providing identical volumetric flows for each fluid at the respective microchannel outflows (abstract, [0012], [0051]). The minimal sequential bifurcation required according to Ehrfeld is a two stage bifurcation, which inherently requires that a linking channel be separated or divided two times. Consequently, any modification of Ehrfeld to divide a connecting channel once in any way other than to split that channel into two identical part channels would be completely and explicitly contrary to the operating principle upon which the Ehrfeld mixer operates.

Claim 1, as amended, recites a micromixer comprising a linking channel that is divided only once and only into more than two part channels and only immediately prior to opening into the mixing chamber. This recited structure is not taught by Ehrfeld and modification of Ehrfeld's micromixer to have the structure recited in claim 1, as amended, would contradict the operating principle of the Ehrfeld micromixer.

In view of the amendment to claim 1 and the foregoing arguments, Applicant respectfully requests that the rejection of claims 1-19 under 35 U.S.C. 103(a) as being unpatentable over Hemming in view of Ehrfeld be withdrawn.

New claims 20 and 21 recite all of the limitations of claim 1. Therefore, for the reasons provided hereinabove, Applicant respectfully submits that new claims 20 and 21 are patentable over Hemming in view of Ehrfeld.

New claim 22 recites a process analogous to claim 1, as amended, but recites distinguishing limitations as process steps in terms of first and second immiscible fluids. The number of part channels (7) into which the linking channel (3) is separated by

microstructure parts (6) is not specified in new claim 22. New claim 22 does, however, specify that the feed stream is divided "only by microstructure parts (6) into part channels (7) immediately prior to entering said mixing zone (5)." The feed stream in the micromixer taught by Ehrfeld must be divided at least twice to achieve its intended purpose. The feed stream in the micromixer taught by Ehrfeld must be divided in at least two sequential locations to achieve its intended purpose, and only one of those locations can be immediately prior to entering said mixing zone. Consequently, it would not have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify Ehrfeld according to Hemming or any other teaching to arrive at the method recited in new claim 22. Applicant respectfully submits, therefore, that new claims 22 and 23 are patentable over Hemming in view of Ehrfeld.

Conclusion

The application in its amended state is believed to be in condition for allowance. Action to this end is courteously solicited. Should the Examiner have any further comments or suggestions, the undersigned would very much welcome a telephone call in order to discuss appropriate claim language that will place the application into condition for allowance.

Respectfully Submitted,



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